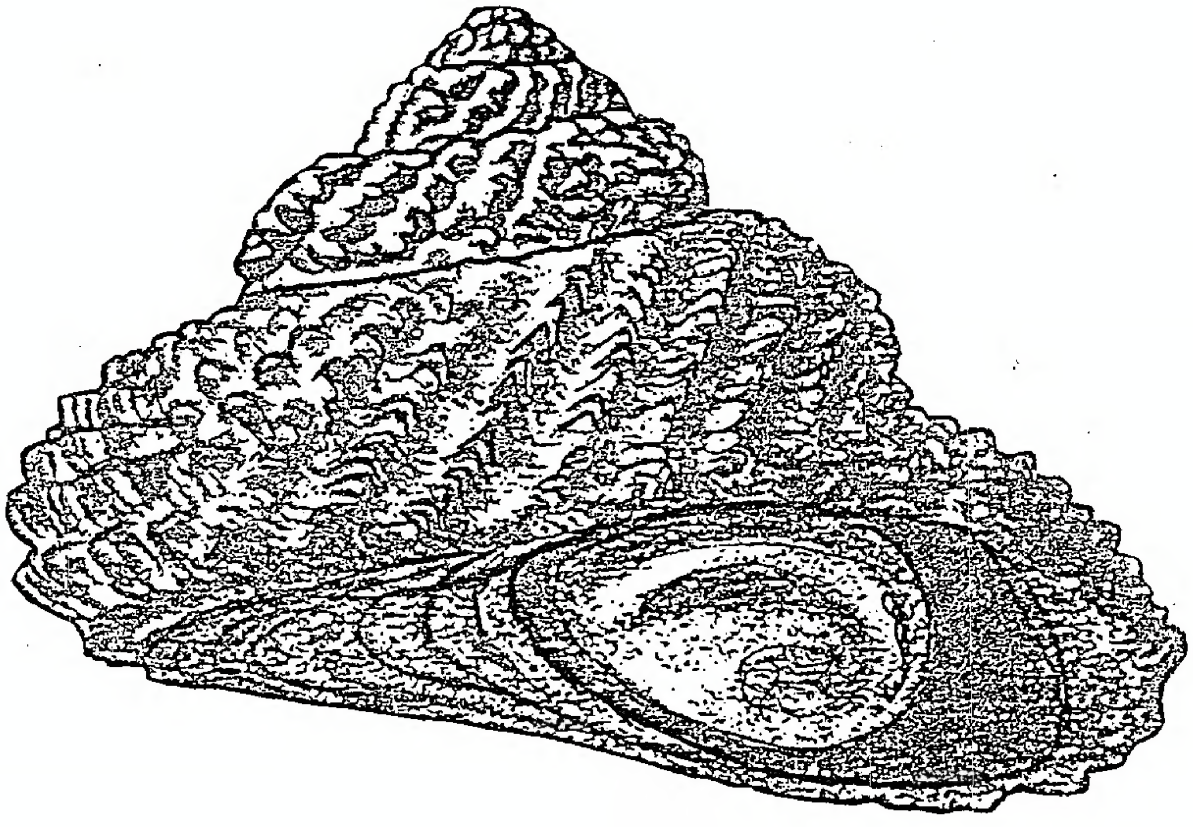
COOKIA



Journal of the Wellington Shell Club

New Zealand

Vol. 6 No. 1 October 1985

COOKIA VOL 6 NUMBER 1 OCTOBER 1985

- CONTENTS -

A classification and catalogue of living world Ranellidae (= Cymatiidae) and Bursidae.	A. Beu.....p 1
A trip to Mahia Peninsula, March 1985.	P. Lakeman.....p 10
A recent trip to Kapiti Is.	M. Taylor.....p 12
A trip to Northland.	H. Hollis.....p 13
The art of cleaning shells.	P. Jamieson....p 14
Notes on shell collecting at Paraparaumu Berach.	H. Hollis.....p 20

A classification and catalogue of living world Ranellidae (=Cymatiidae) and Bursidae

A.G. Beu
New Zealand Geological Survey

March 1985

As a background to explain what I think are the correct names and relationships of the species of Ranellidae and Cymatiidae occurring in New Zealand, I present a list, below, of all the living genera, subgenera, species, and subspecies I know of in these 2 families. The list attempts to show their relationship as clearly as is possible in Linnean nomenclature, and is a summary of 18 years' work on these two families. The list was compiled very critically, that is, I have used the earliest available name in all cases, listed a few of the main synonyms that collectors may be familiar with, thought carefully about their generic and subgeneric classification and possible subspecies relationships, and carefully evaluated all named varietal forms (many of which have turned out to be "good" species). So this represents what I think are the correct, ultimate names to be used for all living species in these families. This is a summary of a longer list, with all synonyms and references, that will be published later.

The list includes 147 species and subspecies of Ranellidae (=Cymatiidae) and 59 of Bursidae, of which 17 species and subspecies of Ranellidae and 2 of Bursidae are known from New Zealand, although 3 of the Ranellidae occur only very rarely and probably don't breed here (**Charonia tritonis tritonis, Linatella caudata,** and **Distorsio constricta habei**). This list of 17 taxa also includes **Sassia kampyla tomlini** from Macquarrie Island, so actually there are only 13 Ranellidae and 2 Bursidae that collectors can reasonably expect to acquire from the New Zealand area.

Perhaps the most obvious point of nomenclature you will note is the change of name of the family from Cymatiidae to Ranellidae. The Code of Zoological Nomenclature says family names have their own priority, and you must use the earliest available one, so we have to use Ranellidae, as it was proposed 58 years before Cymatiidae. Walter Cernohorsky and I have made an **unsuccessful** attempt to have the name Cymatiidae conserved by the International Commission on Zoological Nomenclature, and there is nothing we can do now but get used to the new name as quickly as possible.

Taxa treated as subspecies below are thought to be geographically isolated populations of the one genetic species, that is, they are geographic subspecies in the sense that was originally used for birds by Professor Ernst Mayr of Harvard University. The term "subspecies" has often been used in malacology for varieties occurring together in one population, but such parts of the variation of one population are not recognised by the Code of Zoological Nomenclature. Varieties are recognised by the existence of a range of variation between one extreme of the population and the other extreme. The converse - forms that occur together but do not show a range of morphologically intermediate specimens - is good evidence that the co-occurring forms are separate species, and this is particularly convincing

evidence when the co-occurring forms have partially different geographic ranges. A good example in the list below is the subgenus **Cymatium (Septa)**, which I had thought until recently contained only the one species, **C. rubeculum** (Linné). Study of very large collections has shown that "the Atlantic form", **C. occidentale** (Mörch), a finely sculptured, pale yellow-brown form, occurs in the Indo-West Pacific alongside the red **C. rubeculum** and striped **C. hepaticum** (Röding), the latter two of which are absent from Atlantic faunas. No morphological or colour intermediates are known, so it is clear that these are 3 distinct species. Another obvious example is **C. aquatile** (Reeve), which until recently has been thought part of the variation of **C. pileare** (Linné). However, it is now clear that **C. pileare** does not occur in the Atlantic, but is represented there by the distinct species **C. martinianum** (d'Orbigny), and as **C. aquatile** occurs in both the Indo-West Pacific and Atlantic, and a close examination of large collections shows no morphological intermediates, these are now regarded as 3 distinct species.

The relationships and origins of our fauna seem best thought of by dividing it into 4 groups with different histories:

1. Species with a circum-Subantarctic (or at least partly circum-Subantarctic) distribution, that have spread around the Southern Ocean in geologically recent times after evolving in the northern hemisphere - **Argobuccinum pustulosum, Fusitriton magellanicus, Ranella australasia,** and perhaps **Ranella olearia.**

2. Species that occur in the Atlantic and around the fringes of the Pacific, and are probably not able to compete ecologically with tropical Pacific species (these probably evolved in the Tethys, and have been pushed out of the tropical Pacific by more recently evolved species): **Charonia lampas, Cymatium parthenopeum, Cymatium exaratum.**

3. Tropical Pacific species that only manage to get to New Zealand occasionally, probably as chance spatfalls - **Charonia tritonis, Cymatium labiosum, Linatella caudata, Sassia apenninica, Distorsio constricta, Tutufa bufo.**

4. Endemic southwest Pacific species, that evolved in this area - **Cabestana spengleri** and **C. tabulata, Sassia kampyla, S. palmeri, S. parkinsonia, Bursa verrucosa,** and **Distorsio lewisi** (perhaps a member of our far northern fauna).

Critical list of living world Ranellidae and Bursidae

* = species occurring in New Zealand.

Family RANELLIDAE Gray, 1854 (=Cymatiidae Iredale, 1913)

Subfamily RANELLINAE Gray, 1854.

Genus **Argobucccinum** Herrmannsen, 1846.
Subgenus **Argobuccinum** Herrmannsen, 1846.
(=**Gondwanula** Finlay, 1927;= **Mediargo** Terry, 1968).
Argobuccinum (Argobuccinum) proditor proditor (Frauenfeld, 1865), St Paul & Amsterdam Is., S. Indian Oc.
proditor tristanense Dell, 1963, Tritan da Cunha & Nightingale I., S. Atlantic.
pustulosum pustulosum (Lightfoot, 1786), S. Africa.
pustulosum ranelliforme (King, 1832), S. America.
* **pustulosum tumidum** (Dunker, 1862), S.W. Pacific.

Subgenus **Priene** H. & A. Adams, 1858.
(=**Liohindsia** Coen, 1947).
Argobuccinum (Priene) scabrum (King, 1832) (=**rude** Broderip), Chile.

Genus **Fusitriton** Cossmann, 1903.
(=**Cryotritonium** von Martens, 1904).
Fusitriton galea Kuroda & Habe in Habe, 1961, S. Japan.
magellanicus magellanicus (Röding, 1798) (=**cancellatus** Lamarck), S. America.
* **magellanicus laudandus** Finlay, 1927, N. Zealand.
magellanicus murrayi (E.A. Smith, 1891), S. Africa.
magellanicus retiolus (Hedley, 1914), S. Australia.
oregonensis (Redfield, 1846), N. Japan to California.
takedai Habe, 1979, Emperor Seamounts, N. Pacific.

Genus **Gyrineum** Link, 1807.
Subgenus **Gyrineum** Link, 1807.
(=**Apollon** Montfort, 1810; =**Gyrinella** Dall, 1924).
Gyrineum (Gyrineum) bituberculare (Lamarck, 1816)(=**hirasei** Kuroda & Habe in Habe, 1961), West Pacific.
gyrinum gyrinum (Linné, 1758), West Pacific.
gyrinum wilmerianum Preston, 1908, Indian Ocean.
louisae Lewis, 1974 (=**atlanticum** Fechter, 1975), W. Pacific and Atlantic.
natator (Röding, 1798), northern Indo-West Pacific.
pusillum pusillum (Broderip, 1833) (=**cuspidatum** and **roseum** Reeve, 1844, etc.), Indo-West Pacific.
pusillum concinnum (Dunker, 1862), Red Sea.
Subgenus **Biplex** Perry, 1811.
Gyrineum (Biplex) perca (Perry, 1811), N.W. Pacific.
pulchellum (G.B. Sowerby I, 1825)(=**jucundum** A. Adams, 1853), N.E. Australia.
pulchrum (Gray in G.B. Sowerby II, 1836)(=**Gyrineum perca** var. **aculeata** Schepman, 1909; = **microstoma** Fulton, 1930), W. Pacific.

Genus **Ranella** Lamarck, 1816.
(=**Gyrina** Schumacher, 1817;=**Eugyrina** Dall, 1904; =**Mayena** Iredale, 1917; =**Gyrinopsis** Dall, 1927).
*Ranella australasia australasia (Perry, 1811)(=**vossi** Powell, 1952; =**blacki** Powell, 1954, etc.), S.W. Pacific.
australasia gemnifera (Euthyme, 1889), S. Africa.
* olearia (Linné, 1758)(=**gigantea** Lamarck, 1816; =**multinodosa** Bucknill, 1927; =**ostenfeldi** Iredale, 1937), Mediterranean, E & W Atlantic, S. Africa, St Paul & Amsterdam Is., & N. Zealand.

Subfamily **CYMATIINAE** Iredale, 1913 (1891).
Genus **Cabestana** Röding, 1798.
(=**Aquillus** Montfort, 1810; =**Dolarium** Schlüter, 1838; =**Neptunella** Gray, 1854; = **Cymatilesta** Iredale, 1936).
Cabestana cutacea cutacea (Linné, 1767), Mediterranean & W. Africa.
cutacea dolaria (Linné, 1767) (=**africanus** A. Adams, 1854), S. Africa.
felipponei (von Ihering, 1907), S.E. South America.
* spengleri (Perry, 1811) (=**bolteniana** A. Adams, 1854; =**barthelemyi** Bernardi, 1857), S.W. Pacific.
* tabulata (Menke, 1843) (=**waterhousei** A. Adams & Angas, 1865; =**segregata** Powell, 1933; =**otagoensis** Powell, 1954), S.W. Pacific.

Genus **Charonia** Gistel, 1848.
(=**Tritonium** Röding, 1798, not of Müller, 1776; =**Triton** Montfort, 1810, not of Linné, 1758; =**Buccinatorium** Mörch, 1877; =**Eutritonium** Cossmann, 1904).
Charonia lampas lampas (Linné, 1758)(=**nodiferum** Lamarck, 1822), Mediterranean & E. Atlantic.
lampas pustulata (Euthyme, 1889), Brazil & S. Africa.
* lampas rubicunda (Perry, 1811) (=**euclia** Hedley, 1914; =**capax** Finlay, 1927; =**powelli** Cotton, 1957), S.W. Pacific.
lampas sauliae (Reeve, 1844), S. Japan.
(?*)tritonis tritonis (Linné, 1758), Indo-West Pacific.
tritonis variegata (Lamarck, 1816), Mediterranean & E. & W. Atlantic.

Genus **Cymatium** Röding, 1798.
Subgenus **Cymatium** Röding, 1798.
(=**Lotorium** Montfort, 1810; = **Tritocurrus** Lesson, 1842; =**Nyctilochus** Gistel, 1848).
Cymatium (Cymatium) femorale (Linné, 1758), W. Atlantic.
raderi D'Attilio & Myers, 1984, W. Atlantic.
ranzanii (Bianconi, 1850), W. Indian Ocean.
tigrinum (Broderip, 1833), Panamic W. America.
Subgenus **Gutturnium** Mörch, 1852.
Cymatium (Gutturnium) muricinum (Röding, 1798) (=**tuberosum** Lamarck, 1822), cosmopolitan in tropical seas.

Subgenus **Lotoria** Emerson & Old, 1963.
Cymatium (Lotoria) grandimaculatum (Reeve, 1844), N. Indo-West Pacific.
lotorium (Linné, 1758), Indo-W. Pacific.
perryi Emerson & Old, 1963, N. Indian Ocean.

Subgenus **Monoplex** Perry, 1811.
(=**Lampusia** Schumacher, 1817; = **Cymatriton** Clench & Turner, 1957).
Cymatium (Monoplex) amictum (Reeve, 1844) (=**tremperi** Dall, 1907; =**amictoideum** Keen, 1971), Panamic W. America.
aquatile (Reeve, 1844), Indo-W. Pacific & Caribbean.
corrugatum (Lamarck, 1816), Mediterranean & W. Africa.
gemmatum (Reeve, 1844), central W. Pacific.
intermedium (Pease, 1869), West Pacific.
krebsii (Mörch, 1877), W. Atlantic.
macrodon (Valenciennes, 1832), Panamic W. America.
martinianum (d'Orbigny, 1846), E & W Atlantic.
mundum (Gould, 1849) (=**gemmatum** of most authors, not of Reeve), Indo-West Pacific.
nicobaricum (Röding, 1798), Indo-W. Pacific, E. & W. Atlantic.
* **parthenopeum parthenopeum** (von Salis, 1793) (=**australasiae** Perry, 1811; etc.), Mediterranean, E. & W. Atlantic, S. Africa, S.W. Pacific, N. Indian Ocean, Hawaii.
parthenopeum echo Kuroda & Habe in Kira, 1961, S. Japan to Hong Kong.
parthenopeum keenae (Beu, 1970), Panamic W. America.
pileare (Linné, 1758), Indo-West Pacific.
tranquebaricum (Lamarck, 1816), W. Africa.
trigonum (Gmelin, 1791), W. Africa.
turtoni (E.A. Smith, 1890), St Helena.
vestitum (Hinds, 1844), Panamic W. America.

Subgenus **Ranularia** Schumacher, 1817.
(=**Tritonocauda** Dall, 1904).
Cymatium (Ranularia) aegrotum (Reeve, 1844), West Pacific.
armatum (G.B. Sowerby III, 1897), W. Pacific.
boschi Abbott & Lewis, 1970, N. Indian Ocean.
caudatum (Gmelin, 1791), Indo-W. Pacific.
cynocephalum (Lamarck, 1816)(=**moritinctum** Reeve, 1844; = **caribbaeum** Clench & Turner, 1957), Indo-W. Pacific, E. & W. Atlantic.
dunkeri dunkeri (Lischke, 1868), S. Japan.
dunkeri iredalei (Beu, 1968), Kermadec Is. and Queensland.
encausticum (Reeve, 1844), W. Pacific.
exile (Reeve, 1844), Indo-W. Pacific.
gallinago (Reeve, 1844), W. Pacific.
gutturnium (Röding, 1798), W. Pacific.
moniliferum (A. Adams & Reeve, 1850), Indian Ocean.
oblitum (Lewis & Beu, 1976), W. Pacific.
oboesum (Perry, 1811) (=**retusum** Lamarck, 1822), Indian Ocean.
pyrulum (A. Adams & Reeve, 1850), W. Pacific.
pyrum (Linné, 1758), Indo-W. Pacific.
rehderi Verrill, 1950, Caribbean.
sarcostomum (Reeve, 1844), Indo-W. Pacific.
sinense sinense (Reeve, 1844), W. Pacific.
sinense n. subsp., Red Sea.
testudinarium (A. Adams & Reeve, 1850), W. Pacific.
tripum (Lamarck, 1822), N. Indian Ocean.
n.sp., N.W. Pacific.

Subgenus **Reticutriton** Habe & Kosuge, 1966.
Cymatium (Reticutriton) lineatum (Broderip, 1833), Galapagos.
pfeifferianum (Reeve, 1844), Indo-W. Pacific.

Subgenus **Septa** Perry, 1810.
(=**Simpulum** Mörch, 1852, not of Fabricius).
Cymatium (Septa) flaveolum (Röding, 1798)(=**limbatum** Röding, 1798), Indo-West Pacific.
hepaticum (Röding, 1798), Indo-West Pacific.
occidentale (Mörch, 1877)(=**blacketi** Iredale, 1936), Indo-West Pacific and W. Atlantic.
rubeculum rubeculum (Linné, 1758), Indo-West Pacific.
rubeculum n. subsp., Red Sea.
n.sp., Philippines.
n.sp., Indian Ocean.
n.sp., West Pacific.

Subgenus **Turritriton** Dall, 1904.
(=**Tritoniscus** Dall, 1904; =**Particymatium** Iredale, 1936; =**Cabestanimorpha** Iredale, 1936).
Cymatium (Turritriton) comptum (A. Adams, 1854), Indo-W. Pacific and E. & W. Atlantic.
* **exaratum exaratum** (Reeve, 1844), S.W. Pacific & Hawaii.
exaratum durbanense (E.A. Smith, 1899), S. Africa.
exaratum kiiense (G.B. Sowerby III, 1915), S. Japan.
gibbosum (Broderip, 1833), Panamic W. America & W. Africa.
klenei (G.B. Sowerby III, 1889), S. Africa & Indian Ocean.
* **labiosum** (Wood, 1828), Indo-W. Pacific and E. & W. Atlantic.
lignarium (Broderip, 1833), Panamic W. America.
tenuiliratum (Lischke, 1873)(=**pharcida** Dall, 1889), Indo-W. Pacific and E. & W. Atlantic.
vespaceum (Lamarck, 1822)(=**thersites** Reeve, 1844), Indo-W. Pacific.

Genus **Linatella** Gray, 1857.
Subgenus **Linatella** Gray, 1857.
***Linatella (Linatella) caudata** (Gmelin, 1791)(=**cutaceus** Lamarck, 1816; =**cingulata** Lamarck, 1822; =**poulsenii** Mörch, 1877; etc), Indo-W. Pacific and E. & W. Atlantic.
wiegmanni (Anton, 1838), Panamic W. America.
Subgenus **Gelagna** Schaufuss, 1869.
(= **Lagena** Schumacher, 1817, not of Walker & Boys, 1784; =**Paralagena** Dall, 1904).
Linatella (Gelagna) succincta (Linné, 1771)(=**clandestina** Lamarck, 1816), Indo-W. Pacific & W. Africa.

Genus **Sassia** Bellardi, 1873.
Subgenus **Sassia** Bellardi, 1873.
(=**Semiranella** Gregorio, 1880; = **Monocirsus** Cossmann, 1889; =**Cymatona** Iredale, 1929; =**Charoniella** Powell & Bartrum, 1929, not of Thiele, 1929; =**Austrosassia** Finlay, 1931; =**Phanozesta** Iredale, 1936; =**Proxicharonia** Powell, 1938).
Sassia (Sassia) apenninica nassariformis (G.B. Sowerby III, 1902), South Africa.
* **appenninica remensa** (Iredale, 1936) (=**semitorta** Kuroda & Habe in Habe, 1961), W. Pacific.

kamplya kamplya (Watson, 1885), S.W. Pacific.
kamplya tomlini (Powell, 1955), Macquarie I.
lewisi Harasewych & Petuch, 1980, Caribbean.
marshalli Beu, 1978, Kermadec Is. & E. Australia.
midwayensis (Habe & Okutani, 1968), Midway I., Hawaii.
palmeri (Powell, 1967), S.W. Pacific.
parkinsonia (Perry, 1811), S.W. Pacific.
philomelae (Watson, 1880), Tristan da Cunha.
n.sp., S. Queensland.
Subgenus **Austrotriton** Cossmann, 1903.
(=**Negyrina** Iredale, 1929; =**Charoniella** Thiele, 1929).
Sassia (Austrotriton) bassi (Angas, 1869), S.E. Australia.
epitrema (T. Woods, 1877), Bass Strait.
garrardi (Beu, 1970), S.E. Australia.
mimetica (Tate, 1893), S.E. Australia.
petulans (Hedley & May, 1908), Tasmania.
subdistorta (Lamarck, 1822), southern Australia.
Subgenus **Cymatiella** Iredale, 1924.
(=**Vernotriton** Iredale, 1936).
Sassia (Cymatiella) columnaria (Hedley & May, 1908), Tasmania.
eburnea (Reeve, 1844)(=**lesueuri** Iredale, 1929), S.E. Australia.
pumilio (Hedley, 1903), northern NSW.
sexcostata (Tate, 1888)(=**gaimardi** Iredale, 1929), S.E. Australia.
verrucosa (Reeve, 1844)(=**peroniana** Iredale, 1929), southern Australia.
n.sp.?, southern W. Australia.

Subfamily PERSONINAE Gray, 1854.
Genus **Distorsio** Röding, 1798.
(=**Distortrix** Link, 1807; =**Persona** Montfort, 1810; =**Distorta** Perry, 1811; =**Rhysema** Clench & Turner, 1957).
Distorsio (Distorsio) anus (Linné, 1758), Indo-W. Pacific.
burgessi Lewis, 1972, Hawaii.
clathrata (Lamarck, 1816), W. Atlantic.
constricta constricta (Broderip, 1833), Panamic W. America.
constricta habei Lewis, 1972, W. Pacific.
constricta macgintyi Emerson & Puffer, 1952, W. Atlantic.
decipiens (Reeve, 1844), Indo-W. Pacific.
decussata (Valenciennes, 1832)(=**ridens** Reeve), Panamic W. America.
kurzi Petuch & Harasewych, 1980, Indian Ocean & N.W. Pacific.
perdistorta Fulton, 1938, Indo-W. Pacific & E. & W. Atlantic.
reticulata (Linné, 1758), Indo-W. Pacific.
smithii (von Maltzan, 1884), W. Africa.
n.sp., Indian Ocean - E. Australia.
Subgenus **Distorsionella** Beu, 1978.
(*?)**Distorsio (Distorsionella) lewisi** Beu, 1978, S.W. Pacific (possibly including northern New Zealand).

Genus **Personella** Conrad, 1865.
Personella pusilla (Pease, 1861), West Pacific.

Family BURSIDAE Thiele, 1929

Genus **Bursa** Röding, 1798.
(=**Lampadopsis** Jousseaume, 1881; =**Pseudobursa** Rovereto, 1899).
Bursa (Bursa) asperrima (Dunker, 1862), Indo-W. Pacific and Panamic W. America (Clipperton I.).
bufonia (Gmelin, 1791)(=**dunkeri** Kira, 1961), Indo-W. Pacific.
calcipicta (Dall, 1908), Panamic W. America.
cruentata (G.B. Sowerby II, 1835), Indo-W. Pacific.
grayana (Dunker, 1862)(=**bufoniopsis** Maury, 1917; =**pacamoni** Matthews & Coelho, 1971), W. Atlantic.
lamarckii (Deshayes, 1853), Indo-W. Pacific.
luteostoma (Pease, 1861), Hawaii.
mammata (Röding, 1798)(=**rosa** Perry, 1811; =**siphonata** Reeve, 1844), Indo-W. Pacific.
rhodostoma rhodostoma (Beck in G.B. Sowerby II, 1835), Indo- W. Pacific.
rhodostoma thomae (d'Orbigny, 1842), E. & W. Atlantic.
rugosa (G.B. Sowerby II, 1835), Panamic W. America.
tuberosissima (Reeve, 1844)(=**leo** Shikama, 1964), Indo-W. Pacific.
venustula (Reeve, 1844), W. Pacific.
n.sp., N. Indian & Pacific oceans.

Subgenus **Colubrellina** Fischer, 1884.
(=**Bufonariella** Thiele, 1929; =**Dulcerana** Iredale, 1931, unavailable; =**Annaperenna** Iredale, 1936; =**Dulcerana** Iredale in Oyama, 1964; =**Tritonoranella** Oyama, 1964).
Bursa (Colubrellina) awatii (Ray, 1949)(=**rehderi** Beu, 1978), N.W. Pacific.
condita (Gmelin, 1791), W. Pacific.
corrugata corrugata (Perry, 1811)(=**caelata** Broderip, 1833; =**semigranosa** Lamarck, 1822; =**louisa** M. Smith, 1948), Panamic W. America.
corrugata ponderosa (Reeve, 1844), W. Atlantic.
corrugata pustulosa (Reeve, 1844), W. Africa & Ascenion I.
fijiensis (Watson, 1881), deep water off Fiji (status?).
granularis granularis (Röding, 1798), Indo-W. Pacific.
granularis cubaniana (d'Orbigny, 1842), W. Atlantic.
latitudo latitudo Garrard, 1961, E. Australia.
latitudo natalensis Coelho & Matthews, 1970, W. Atlantic.
latitudo wolfei Beu, 1981, W. Pacific.
ranelloides ranelloides (Reeve, 1844), S. Japan.
ranelloides humilis Beu, 1981, Indian Ocean.
ranelloides tenuisculpta Dautzenberg & Fischer, 1906 (=**finlayi** McGinty, 1962), E. & W. Atlantic to S. Africa.
scrobilator scrobilator (Linné, 1758), Mediterranean to Cape Verde.
scrobilator coriacea (Reeve, 1844), W. Africa south of Cape Verde.
* **verrucosa** (G.B. Sowerby I, 1825), S.W. Pacific.
2 n. spp., Philippines.

Genus **Bufonaria** Schumacher, 1817.
Subgenus **Bufonaria** Schumacher, 1817.
(=**Chasmotheca** Dall, 1904; =**Bursina** Oyama, 1964).
Bufonaria (Bufonaria) albivaricosa (Reeve, 1844), N.W. Pacific.
crumena crumena (Lamarck, 1816), Indian Ocean.
crumena cavitensis (Beck in Reeve, 1844), W. Pacific.

echinata (Link, 1807)(=**spinosa** Lamarck, 1816), N. Indian Ocean & N.W. Pacific.
elegans (Beck in G.B. Sowerby II, 1836), Andaman Is. and Indonesia.
fernandesi Beu, 1977, W. Indian Ocean.
foliata (Broderip, 1833), Indian Ocean to N.W. Australia.
gnorima (Melville, 1918)(=**koperbergae** Altena, 1942), deep water, Indo-W. Pacific.
margaritula (Deshayes, 1832), Indo-W.Pacific.
nobilis (Reeve, 1844), N.W. Pacific.
pacator (Iredale, 1931), W. Pacific.
rana (Linné, 1758), N. Indian & W. Pacific oceans.
subgranosa (G.B. Sowerby II, 1836), Philippines and N.E. Australia.
thersites (Redfield, 1846), W. Pacific.
n.sp., N.W. Pacific.
n.sp.?, Red Sea.

Subgenus **Marsupina** Dall, 1904.
(=**Buffo** Montfort, 1810, not of Lacépède, 1788).
Bufonaria (Marsupina) bufo (Bruguière, 1792)(=**spadiceus** Montfort, 1810; =**crassa** Dillwyn, 1817), W. Atlantic.
nana (Broderip & Sowerby, 1829)(=**albofasciata** G. B. Sowerby II, 1836), Panamic W. America.
Subgenus **Aspa** H. & A. Adams, 1853.
Bufonaria (Aspa) marginata (Gmelin, 1791)(=**laevigata** Lamarck, 1822), Mediterranean & W. Africa.

Genus **Crossata** Jousseaume, 1881.
Crossata californica californica (Hinds, 1844), California.
californica sonorana (Berry, 1960), Baja California.
ventricosa (Broderip, 1833), Ecuador & Peru.

Genus **Tutufa** Jousseaume, 1881
Subgenus **Tutufa** Jousseaume, 1881
Tutufa (Tutufa) bardeyi (Jousseaume, 1894), N. Indian Ocean.
bubo (Linné, 1758) Indo-West Pacific.
* **bufo** (Röding, 1798), Indo-West Pacific.
tenuigranosa (E.A. Smith, 1914), N.W Pacific.
Subgenus **Tutufella** Beu, 1981
(=**Lampas** Schumacher, 1817, not of Montfort, 1808)
Tutufa (Tutufella) nigrita Mühlhäusser & Blöcher, 1979, W. Indian Ocean.
oyamai Habe, 1973, W. Pacific & N. Indian Ocean.
rubeta (Linné, 1758), Indo-West Pacific.
n.sp., Philippines.

A TRIP TO MAHIA PENINSULA, MARCH 1985.

PAT LAKEMAN

Work prevails upon most of us to the extent that holidays cannot always be arranged to mesh with most advantageous tides. So it was when Graham Aamodt and I visited Mahia Penninsula in March 1985, but I took comfort in the expectation of long fine days to spend happily shelling and exploring. That goes to show how wrong you can be. We calculated later that fine weather and daylight coincided for barely one-third of our stay and most of that seemed to be high tides! (Lest anyone think we were put off just by a bit of rain, let me add that the same storms flooded areas of Hawkes Bay, cut off the water supply to Wairoa and closed major highways for days).

The combination of weather and tides prevented us from any shell hunting at all at some locations. We were guided by the Club trip to Mahia reported in the September 1983 "Cookia", and adopted the same place names for the various locations. We were able to do no collecting at all at Moemoto Bay, and the Table Cape area was virtually bare. The Cemetery Point area, so fruitful on the Club's 1983 visit, yielded little of interest, but either side of Auroa Point, particularly to the west, proved quite a treasure trove.

At one quite identifiable spot to the west of Auroa Point, the papa reef which surrounds most of Mahia Penninsula shelves steeply into the sea - an ideal fishing spot for Graham and a rich source of very interesting if rather worn washups for me. I would say that rough weather would be needed to bring up shells at this spot, and our holiday was not short of that. A **Cominella excoriata tolagaensis** was found here, and what we felt was the find of the trip, six **Mitra carbonaria**. Finding one of these on our first visit to the spot caused us to go back several times at least for a quick look - the six specimens were found over three or four visits, and yet all but one were at virtually the same spot. This area also produced **Taron dubius, Buccinulum linea fuscozonatum,** and **Cominella quoyana quoyana,** none of which I had collected before. A small but quite fine **Cabestana spengleri,** a juvenile **Maurea tigris,** and one **Trivia merces** were also collected.

Obviously when a good spot is found, the surrounding area is covered pretty thoroughly. To the east of Auroa Point (but not as far as Cemetery Point) was also productive: two larger **T.merces,** an second **B.linea fuscozonatum,** small **Janthina exigua,** and a small but well-sculptured **Turbo granosus** were collected. New finds for me were **Gregariella barbata,** and a small **Cantharidus opalus,** that on comparison with a fine **C.opalus opalus** found later appears closer to the Chatham Is subspecies, **C.opalus cannoni**. This area also produced a damaged but quite recognisable **Agnewia tritoniformis.**

Mahanga Beach was not a particularly rich source, although a very

large single valve of **Zenatia acinaces** was found, plus single valves of **Resania lanceolata**. A finely coloured **Gari lineolata** was also collected along with two small examples of **Xenophalium** sp with imperfectly dissolved varices. One was **X.pyrum pyrum**, but the other looked quite different. The woes of positive identification seem to me to be never-ending!

Not far (for crows!) from Mahanga Beach is Oraka Beach, which is an open sandy beach near the mouth of the Maungawhio Lagoon, but further on is overrun by a papa reef that rises steeply up to form a low cliff which can only be negotiated at low tide. At certain spots the cliff face was very loose and crumbly. The disconcerting sound of mini-landslides could frequently be heard. Large, encrusted **Cabestana spengleri** were found here, with heavy **Penion sulcatus** and **Mayena australasiae**. The more open sandy stretch yielded **Alcithoe fusus fusus**, a **Cirsotema zelebori**, a brilliant yellow single valve of **Chlamys zelandiae**, a finely coloured **Cantharidus opalus opalus** and yet another **Xenophalium pyrum pyrum** with undissolved varices (the local specimens must just be lazy). New to my collection from this location was a tiny **Hiatella arctica**. Beautiful **Austrofusus glans** were found, their rich colour quite unlike their pale cousins that abound on the Kapiti Coast (and I had thought them an unattractive species). Some of the **A.glans** were complete with animal and operculum, but more exciting was finding a live **Poirieria zelandica**. When I removed the animal from this specimen, it appeared to have a purple gland or organ within its body. I wonder if this was the source of the purple dye which shells of the Murex family were exploited for in Roman times. Now Powell doesn't tell me that!

A location not mentioned in the report of the Club's 1983 visit is Mahia Beach itself. At low tide it was quite interesting (and extremely beautiful) yielding a tiny **Chlamys zeelandona**, a single valve of **Lithophaga truncata**, a small but complete **Myadora striata**, quantities of **Amalda australis**, a single valve of **Offadesma angasi** and a badly damaged (but hinge area intact) **Zenatia acinaces**. Dramatically out of place, a piece of **Hyridella menziesi** - wonder how far that had travelled. Probably because of the rough weather, a large patch of beach was piled with fine seaweed. In this were live **Struthiolaria papulosa**, their tiny operculums quite disproportionate to the shells. A small **Argobuccinum tumidum** was also amongst the weed, animal gone, but the aperture inhabited by a large **Maoricrypta monoxyla**.

The southern end of Mahia Beach runs into a rocky point, **Penion sulcatus** country again. We first explored this on a grey and rainy day, wrapped against the cold wind (yes, in March). Even highly competitive games of scrabble had palled and we went out determined to get fresh air and exercise even if it meant a complete change of clothes when we came back - which it did. We were happy to find a little **Haliotis virginea virginea** of beautiful colour, but every now and then life has its small rewards. Ours that day was a large **Maurea tigris**, complete with animal and operculum, and perfect except for the tip of its spire. That tended to put an end to our complaints!

A RECENT TRIP TO KAPITI ISLAND

M. TAYLOR

The morning of our trip dawned very wet after all those weeks of beautiful weather! However, we went along to where the boat was, only to find no boat at all, just a few hardy souls who were keen enough to brave the inclement weather. We guessed that the boatman had decided Kapiti was not a good idea and snatched a little extra kip.

Eventually the boatie decided reluctantly that maybe we would go, so we all leapt on board, and off we went; at least, off we didn't go as the motor seemed to be sharing the idea that Kapiti was out of the question, as it gave a few half-hearted coughs. then after much persuasion and muttering, it leapt into action for about 100 yards and dumped us on a sandbank. More muttering, and with the help of poles we were at last on our way.

Kapiti certainly did look rather ominous when we could at last see it through the rain which by now was steady and heavy. As we clambered off the boat one hour late we heard someone (the boatie) suggesting we leave the island at least half an hour early. "Over our dead bodies" seemed to be the general feeling.

Most of the hardy souls ran off to find shelter, but as I was detailed to wait on the beach for the next boat, I thought shelling might be a good idea. Within about a 100 yards there was a sizeable wash-up of **Cantharidus opalus** in good condition, plus **C.purpureus,** and several **Maurea punctulata** with one **M.waikanae. Modelia granulosa** were also there, many broken, as well as **Cellana denticulata, C.radians, C.ornata,** and a few **Siphonaria.** Some good specimens of **Buccinulum pallidum** were on the high-tide line with the ever-present **Trochus tiaratus** and **Haliotis virginea,** both in good condition.

The tide was very high so there was no chance of investigating the rock pools. Instead, bird watching was the order of the day as the sun popped out about midday along with all the birds. We had a most interesting afternoon and even had a great view of the very rare saddle-back; a beautiful bird about the size of a tui, bluish black with a rust red back and rump. For good measure, one pair was even feeding a young one.

When the boat turned up at 2.30 pm we showed our mean streak and all faded back into the bush to enjoy our last half hour on Kapiti.

Shells collected on a previous trip include **Pelicaria vermis, Astraea heliotropium, Mayena australasia, Maoricolpus roseus, Thais orbita, Murexsul octogonus,** and **Cominella maculosa.**

A TRIP TO NORTHLAND

H. HOLLIS

Peter and I travelled north in early February on a trip to the far north of Auckland. As a shell collecting expedition, our trip was not a huge success. However, our holiday was made very enjoyable by the hospitality of northern shell club members and we saw many beautiful collections. Our thanks to all these members, including Frank and Verna Johnson, Hunter and Molly Seelye, George and Isabell Rigden, Albie and Jean Allo, Bob and Thora Penniket, and Betty and Bob Grange.

Our first attempt at collecting was at Taupiri Bay. Neither of us found any shells worth collecting. I brought back some shell sand and the most notable find was a small **Zelippistes benhami.**

Next call was at Rarawa Beach where we walked north around Paxton Point to Great Exhibition Bay. Again there were no shells. The beaches were so bare we returned by the track over the hill, due also to the rising tide and big swell.

Onwards to Spirits Bay where the tide was wrong for getting on to the island. Had a good swim but no shells except fossil **Anadara trapezia.**

Back to Paua on Parengarenga Harbour for the low tide. We walked out to Dog Is and searched for **Conus kermadecensis.** No luck. A good find, however, was some live **Natica migratoria;** Peter found a very large one. I also collected live **Monoplex parthenopeus.** We then moved to the wharf area and collected **Maurea tigris, M.punctulata** (ampla form), **M.pellucida spirata, Thais orbita,** and **Cabestana spengleri.** We searched in vain for **Hydatina physis** and **Bullina lineata.** We returned the next morning at daylight for more collecting and snorkelling.

We also called at Ahipara Beach and Shipwreck Bay but a big sea was running and it was not safe to walk to Reef Point as the tide was rising.

We both exchanged shells with northern members and came back with some good additions to our collections. At Opua we were lent a dinghy and rowed out to visit an overseas yacht, the "Sea Loon". The owners started from Liverpool and are having a very extended trip around the world. Two of their Pacific calls were the Tuamotu and Marquesas Islands. They had some really interesting shells to show us.

Our best visit was to Bob and Thora Penniket, and Bob has made a really good recovery from his heart by-pass operation. We spent much time in the shell room and a large part of the morning photographing some of Bob's beautiful and unusual shells.

THE ART OF CLEANING SHELLS.
(OR WHAT CAN BE ACHIEVED WITH A FEW SIMPLE TOOLS AND SOME HOUSEHOLD SUBSTANCES)

P.R. JAMIESON

This article has resulted from a talk given to the Wellington Shell Club, July 1984.

I became interested in cleaning shells for two resons. Firstly, when I made the effort to clean a shell, I often found it came up better than the one I already had in my collection. Secondly, as I began to trade shells overseas, it became necessary to prepare and clean quantities of shells, so the easier it was to clean them the better for me.

However, I want to make one thing plain right from the start. I want to giveas wide a range of cleaning methods as possible. Not all these are necessarily a good thing for the shell if you want to retain a strictly scientific collection. On the other hand what we do with our shells is our own responsibility, so I think we should know all the options. Personally, I like my shells to be as perfectly cleaned as possible, but others may want to keep them as they naturally occur. That's entirely YOUR decision. At this stage I wish to say that the ideas that follow are not entirely my own, but much I've learnt from fellow collectors. However, some things you learn by trial and error, or just sheer accident. I'm still learning, and always eager to hear of new ideas.

But firstly, let's deal with removing the animal.

1. Boiling: not very satisfactory, as shell lustre may be damaged, and if the tip of the animal remains in the shell another method must be used to deal with this anyway. Place shells in a pot of water, bring SLOWLY to the boil. Cool slowly. Remove animal in usual manner.
2. Freezing: Animal shrinks and comes away from shell which may enable the animal to be hooked out once thawed. Same problem as with boiling, in that if part of the animal remains, it has to be dealt with by some other method. However, shells can simply be frozen till you have time to deal with them, which is an advantage.
3. Alcohol/meths: Shrinks animal. Small shells (less than 1 cm) may be placed into 100% solution for several days. Remove and dry, no need to remove animal unless you particularly want it. Larger shells may be placed in a 50-75% meths/water solution for a longer period (approx 1-3 weeks depending on size). Remove animal in usual way.
4. Bury in garden: Place shell with spire up and aperture down in soil. Leave till animal has rotted away. Most common method used in tropics where ants quickly dispose of all animal matter, including operculum! Not very satisfactory here, as prolonged period will result in the rotting flesh staining the shell, especially the aperture.

General Tips:

When removing the animal from a univalve, coil the SHELL, not the animal. As the animal uncoils, try and do so down around the columella rather than directly out or around the body whorl. This will result in far fewer breakages of the animal which leaves the smelliest parts behind, especially with species such as **Buccinulum.**
PROBLEM: Volutes! These invariably break off leaving a large part of the animal behind. Try soaking them in caustic soda if this occurs, and wash out using a high pressure hose (and be prepared to get wet).

A. AGENTS USED TO CLEAN SHELLS:
Caustic soda
Bleach
Liquid scourer
Disenfectant
Oil
Acid

1. Caustic soda: Can be purchased from a supermarket.
Uses - softens coralline crud, therefore assisting removal.
- softens periostracum, making removal easy.
- dissolves remaining animal tissue.
Precautions - use rubber gloves or tongs to handle shells.
- shells must be washed thoroughly in running water before direct handling.
- dissolves operculums too, so remove these before immersion
Advantage - will not harm shell or shell colour in any way.
Disadvantages - handling dangerous.
- does not remove stains.
Method - 1 tablespoon dissolved in 1 pint of water. Water become warm and cloudy as it dissolves (stir), and clears when it has done so. ALWAYS add the caustic soda to water, NEVER add water to the caustic soda.
- place shells in solution with tongs, spire downward to allow air to escape and solution to penetrate right down where the remains of the animal are. Leave overnight, or longer if convenient. Wash thoroughly with running water before handling. Scrub with nail brush to remove periostracum from smooth shells (eg. cones) or a wire brush for ribbed shells (eg. cymatids). Rinse well to remove animal remains. May need high pressure squirt from hose to assist with stubborn shells. Sometimes several soaks in caustic soda followed by thorough rinsing may be necessary with the most difficult ones, eg. **Penion, Fusinus.**
- the shell is now ready for further treatment

or cleaning.

2. Bleach: I simply use Janola.
   Uses - softens coralline crud.
   - helps dissolve animal remains.
   - helps soften periostracum.
   - removes stains and brightens up the shell generally. Especially good to remove plant stains, eg. algae.
   Precautions - delicate, thin shells, eg. brachiopods and **Chlamys** may dissolve completely if left too long.
   Advantage - absolutely wonderful as a stain remover.
   Disadvantage - may damage the shell lustre and colour if left too long. For this reason, I tend to use caustic soda for prolonged use to remove animal or periostracum, and only use bleach for a final clean or removal of stains. However, I have left several Alcithoe fusus in a 100% solution for 3 days without any ill-effect, and this removed stubborn mud stains.
   Method - the dilution with water is always a question people ask. I use 100% for a short period if I only want to remove stains (5-10 mins is usually enough). This does not affect the shell colour or lustre. The same effect can be obtained by leaving in a weak solution (normal dilution as stated on the container) overnight, but I'm always too impatient to do this!
   - remove and wash thoroughly, inside and out. Smell disappears after a day or two exposed to the air.

3. Liquid scourer, and Pot mit: Jif or Big Boy; Scotch Brite or Pot Mit. I use only the tough plastic type of pot mit, not steelo pads.
   Uses - great to do surface cleaning of grime and soft growths, particularly on smooth shells. Does not scratch surface.
   - these, and a lot of elbow grease will remove all but the most stubborn of rust stains, especially those on volutes.
   Method - you can be as vigorous as the shell allows. Obviously, fragile shells will not withstand hard rubbing.

4. Disinfectant. I always add a good measure of household type disinfectant to water I'm cleaning shells in, especially for the initial wash after removing the animal. It also helps considerably in disguising those all-penetrating odours, especially if cleaning indoors.

5. Oiling. The first of our "grey areas". Some people say you should never oil your shells. But for display purposes, there's nothing like a little oil to improve the looks and colour of any shell.

Uses - restores the shell's natural "wet look".
- helps keep periostracum from cracking and flaking.

Advantage - "covers a multitude of sins".

Disadvantage - can be messy if too liberal, and oil will stain cabinet linings if excess is not removed.

Method - apply by hand to smooth shells, or with a toothbrush on rough shells. Wipe off excess with a lintless cloth. I use baby oil, but this does dry off after a time, requiring re-application. It is easy to apply and spread, though. Silicon oil is thicker and harder to spread on rough shells, but will last longer.

Problem - spiny shells, like **Poirieria**. Apply a liberal amount straight onto the shell. Spread gently with a soft toothbrush. To remove excess rinse quickly in very warm water and allow to dry. A quick rinse usually leaves enough of a coating on, but removes the excess.

6. Acid. A VERY touchy subject. I personally only ever use acid as an absolute last resort. Some people are able to use it with great effect, though. A lot of trial and error is needed to perfect its use; too much, and your shell is ruined. The art is to use sufficient, but not so much as to make it noticeable that you have done it!

Uses - removing thick coralline encrustations.
- removing rust stains.

Advantage - the only easy method to remove rust.

Disadvantage - easy to over use and thus ruin specimen.
- for obvious reasons, great care must be taken when using it.

Methods - there are 2 methods of application that I know of:-

1. The "Mike Meads" method. Prepare a 5 -10% solution of hydrochloric acid with water (add acid to water, not water to acid!!) in, say, an ice cream container. Place entire shell in this, one at a time. You must be alert and stay with it the entire time. Let soak for a short time in the solution (10-20 seconds, longer if very encrusted). Remove and plunge into fresh water to halt the process. Repeat if necessary. The shell will bubble furiously in the acid bath. Use tongs (stainless steel) or rubber gloves to handle specimen. This method is ideal if you want to clean an entire shell surface.

2. The second method is best if you only want to treat small areas eg. a patch of stubborn rust stain that will not budge with the pot-mit/liquid scourer method. Pre-wet shell, place acid solution in container, dunk toothbrush in solution and apply to desired area. Rinse under water, and repeat if necessary. Used with great care, acid can be very effective in making an otherwise terrible object into a very presentable specimen. Do practise on some common "throw away" shells first!!

B. INSTRUMENTS USED IN CLEANING SHELLS.

Wire brush
Pot mit
Dental instruments
Knives and needles
Soft brushes.

What you use will largely depend on what is available around the house. I find dental instruments of various sorts invaluable, but a reasonable job can be achieved with a sharp vegetable knife and needles, with most shells.

1. Wire brush - essential in everyone's cleaning kit, and a great time-saver. Buy from a hardware shop. Doesn't seem to harm or scratch shells, though I've never tried to use it on smooth, highly polished shells.

Uses - excellent for removing coralline crud, especially after a pre-soak in caustic soda, and on grooved shells, as it gets right in the crevices.
- removes periostracum from rough shells, again after the caustic soda treatment.
- removes weedy growths that ordinary brushes don't seem to budge, eg, those lovely **Thais orbita** from Parengarenga Harbour.

Method - simply scrub away as vigorously as the shell will allow.

2. Pot mit - discussed above along with liquid scourer.

3. Dental instruments, knives, and needles - the former in particular are absolutely invaluable. If you can't get any from a friendly dentist, instruments can be purchased from

Shalfoon Bros Ltd,
Kempthorne Medical Supplies Building,
76-80 Adelaide Rd,
Wellington.

Recently they have been selling a large amount of old stock at very low prices ($2.00 per instrument).

I have Judy and Kevin Burch to thank for introducing me to these instruments, the first one they originally gave me got so much use it eventually suffered metal fatigue and broke! Since then, I've bought a wide variety of types, and find the following most useful: ones with a rasp on the end (various sizes of head and surface roughness); ones with a wide, scraping blade

(scalers),which are best of the lot; ones with a fine point on the end, good for getting down tiny grooves, eg. **Chlamys**. Needles, knives, etc. can be used in place of the above, but I find these much more arkward, and not as effective. They just cannot do the final cleaning job a dental instrument can.

4. Soft brushes - eg. nail brush, toothbrushes of different lengths and softness. Good for general cleaning jobs. I have a wide variety of brushes, and some are more suitable than others for various things.

GLUEING BIVALVES TOGETHER

1. How to unglue a specimen: Simply soak in hot water for a few minutes, then prise open. The glue itself can be removed with the aid of a needle, even if it has been spilt onto the actual specimen, or the specimen has been glued to something. I frequently have to unglue specimens because someone hasn't cleaned the inside of the valves properly and it shows through the specimen. Also, if too much glue has been used, the valves may not sit straight.

2. How to re-glue a specimen: I use a Superglue pen. Only a tiny amount is needed, so the valves sit in place properly. Also, it dries in 10 seconds, so if the valves are bumped just after glueing, they don't set at an odd angle. To glue very fragile shells together, place a drop of Superglue on a piece of card, and dip the surface to be glued into that, then place the valves together. When glueing **Chlamys**, it is often necessary to remove the entire black ligament that normally holds the valves together. this is much easier to do if soakedin hot water first.

THE ORDER OF THINGS

To give you some idea of what's involved in the treatment of one shell, let's take a couple of examples:-

a coralline-encrusted **Mesopeplum**

a **Thais orbita** covered in green algae and coralline growths.

Mesopeplum:

Having removed the animal, soak for 24 hours in a caustic soda solution to soften the coralline crud. Remove and wash thoroughly, then brush vigorously up and down the ribs with a wire brush. Finish removing the coralline with the aid of various dental instruments, and soak in 100% Janola for 10 minutes, wash well, and allow to dry. Brush lightly with oil using a soft toothbrush and wipe off excess with a lintless cloth.

Beautiful!!

Thais orbita:

Remove animal in the usual way, if it breaks off, try a high-pressure hose. Brush vigorously with a wire brush to remove weedy growths. now you can see what you've got to work on. Soak in caustic soda solution if any coralline crud remains, or if you still haven't got all the animal out. Use a wire brush again if it needs it to remove any remaining crud, or pick off with dentalinstruments. Soak in 100% Janola for 10 minutes, rinse well and allow to dry. Apply a light coating of oil with a soft

toothbrush, and wipe off any excess.

I bet you never imagined a **Thais orbita** could be such an attractive shell!!

Cleaning shells is both hard work and time-consuming, but the results can be so pleasing it makes all the effort worthwhile. HAPPY CLEANING !!

NOTES ON SHELL COLLECTING AT PARAPARAUMU BEACH

H. HOLLIS

The following observations are based on my daily walks between Waikanae River and Raumati. Paraparaumu Beach is mainly sand with some pumice and river silt near the river mouth. It has extensive tidal flats and shelves gently to 35 fathoms in the channel. Kenakena Point is the nearest portion of mainland to Kapiti Is, and from here is approximately 3.25 miles to Rangatira Point on Kapiti. It is the focal point for my notes and lies at latitude 40 53'S and longitude 174 59' E (see figure).

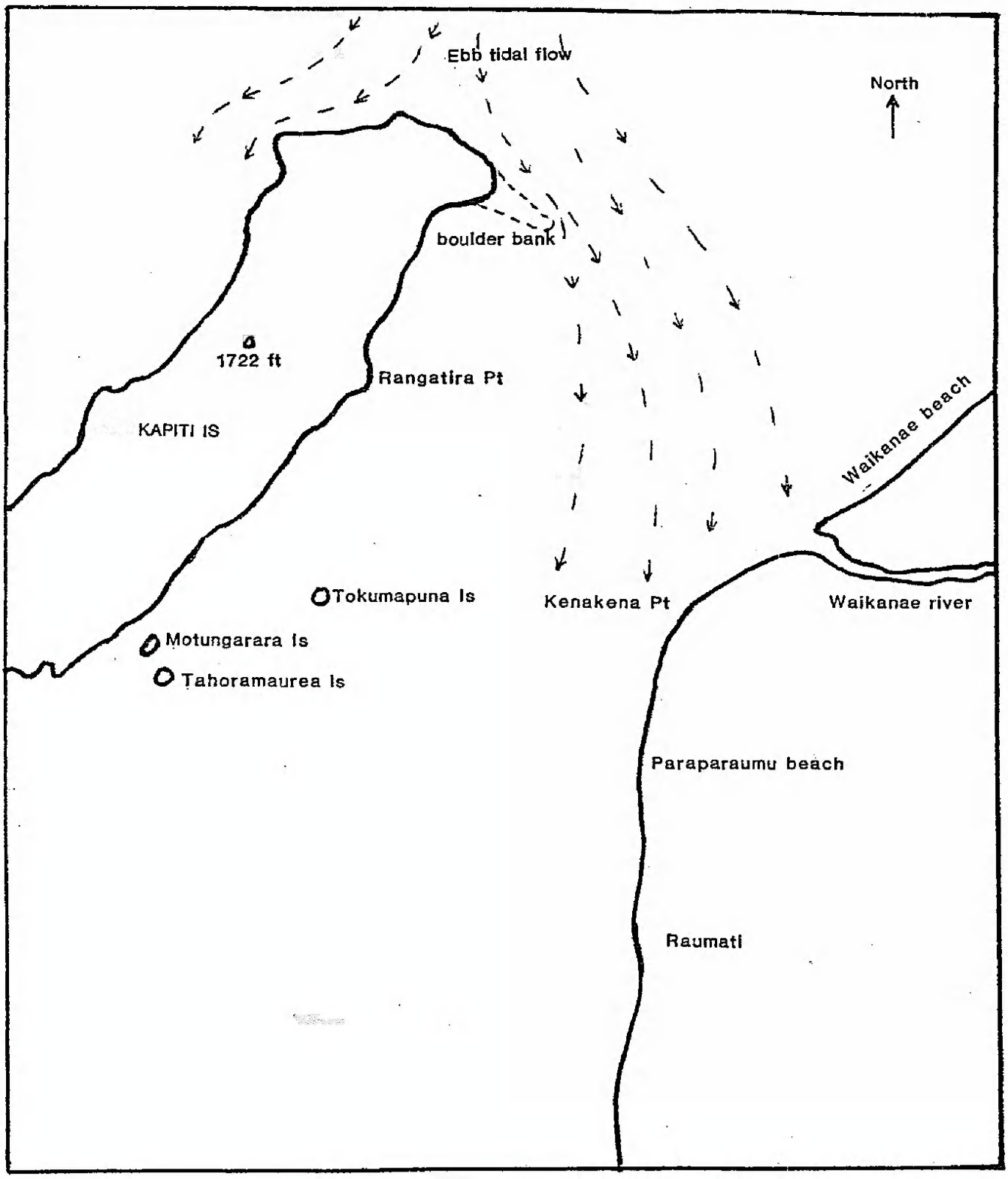
The ebb tide, which is much stronger than the flood, runs in a generally southerly direction from Cape Egmont. The tidal stream meets the north shore of Kapiti and is deflected around the NE point to form a strong rip. This forces the water towards the shore north of Kenakena Point in a SE direction. It is this current which deposits most of the shells on our coastline. Most are sand dwellers, but some are rock and weed dwellers from Kapiti Is.

The best time to collect is on an ebb tide after a strong NW blow. The shells seem to come in approximately 3 tides after the wind drops. The whole coastline covered by the sketch map is productive, but the great majority of my finds have been in the 0.75 mile stretch north of Kenakena Point, and for 0.25 mile south.

Shells are very spasmodic in their time of arrival and I cannot give a best time of the year to collect. There are always the common bivalves, triangle shells, tuatuas, and **Dosinia anus**. When shells do come in, there can be an amazing variety for a small area. Some are rarely seen and others are quite common. We also get quite a variety of fossils, some of which come from Kai-Iwi, near Wanganui. Others I think come from offshore fossil beds in deep water.

I have been collecting on the local beach for about 6 years and have attached a list of species collected. They have been placed in the systematic order given in Powell's "Mollusca".

Please do not expect to find all the shells listed every time you visit our beach - you won't!!


Ebb tidal flow
North
boulder bank
1722 ft
Rangatira Pt
KAPITI IS
Waikanae beach
Tokumapuna Is
Kenakena Pt
Waikanae river
Motungarara Is
Tahoramaurea Is
Paraparaumu beach
Raumati

GASTROPODA:

Haliotis iris
H.australis
H.virginea virginea
Scutus antipodes
Cellana denticulata
C.radians
Melagraphia aethiops
Diloma nigerima
Cantharidus opalus opalus
C.purpureus
Trochus viridis
Maurea tigris
M.pellucida
M.selecta
M.waikanae
M.punctulata
Umbonium zelandicum
Turbo smaragdus
T.granosus
Astraea heliotropium
Cookia sulcata
Nerita melanotragus
Littorina cincta
L.antipodum
Maoricolpus roseus
Zeacumantus subcarinatus
Struthiolaria papulosa
Pelicaria vermis
Sigapatella novaezelandiae
Zegalerus tenuis
Maoricrypta costata
M.monoxyla
Tanea zelandica
Globosinum drewi
Xenophalium pyrum
Cabestana spengleri
C.waterhousei
Monoplex parthenopeus
Argobuccinum tumidum
Mayena australasia
Fusitriton retiolus
Columbarium spiralis
Poirieria zelandica
Maoricopsis octogonus
Pterotyphis zelandicus
Xymene ambiguus
Thais orbita
Haustrum haustorium
Cominella adspersa
C.maculosa
C.quoyana
C.elegantula marlboroughensis
Austrofusus glans
A.chathamensis

Buccinulum linea
Penion sulcatus sulcatus
P.s.adusta
P.dilatatus
Aeneator otagoensis
Glaphyrina vulpicolor
Amalda australis
A.mucronata
Alcithoe arabica
A.swainsoni
A.fusus fusus
Phenatoma rosea
Duplicaria tristis
Janthina janthina
J.exigua
J.globosa
Marinula filholi
Amphibola crenata

CEPHALOPODA

Spirula spirula
Argonauta nodosa

BIVALVIA

Solemya parkinsoni
Barbatia novaezelandiae
Glycymeris laticostata
G.modesta
Perna canaliculus
Modiolus areolatus
Modiolarca impacta
Atrina zelandica
Ostrea charlottae
Pecten novaezelandiae
Mesopeplum convexum
Chlamys dieffenbachi
C.gemmulata
Limatula maoria
Cucumerunio menziesi
Divaricella huttoniana
Mactra discors
M.murchisoni
M.ovata ovata
M.o. tristis
Longimactra elongata
Scalpomactra scapellum
Spisula aequilateralis
Zenacia acinaces
Resania lanceolata
Paphies australis
P. subtriangulata
P. s. quoyii
P.ventricosa
Tellina spenceri
T.gaimardi
T.liliana
Gari lineolata

Soletellina nitida
S.siliqua
Chione stutchburyi
Dosinia subrosea
D.anus
Notopaphia elegans
Bassina yatei
Panopea zelandica
Anchomasa similis
Myadora striata
Offadesma angasi
Cleidothaerus albidus

BRACHIOPODA

Terebratella inconspicua